REMARKS

The Amendments

Claims 1 and 12 are amended to modify the recitation of the helical pitch value. This is supported by the disclosure at page 12, paragraph [0035], and in the Example, for example. Support for new claim 16 is found in the specification, for example, in the original claim language (i.e., "one or more") and in Example 5. Support for new claims 17 and 18 is found in the specification at pages 9-12, paragraphs [0032] to [0034].

To the extent that the amendments avoid the prior art or for other reasons related to patentability, competitors are warned that the amendments are not intended to and do not limit the scope of equivalents which may be asserted on subject matter outside the literal scope of any patented claims but not anticipated or rendered obvious by the prior art or otherwise unpatentable to applicants. Applicants reserve the right to file one or more continuing and/or divisional applications directed to any subject matter disclosed in the application which has been canceled by any of the above amendments.

The Rejection under 35 U.S.C. §112, first paragraph

The rejection of claims 1-15 under 35 U.S.C. §112, first paragraph, for being non-enabling is respectfully traversed.

The rejection is apparently made on the basis that one of ordinary skill in the art would not have been taught how to make and/or use the invention of the scope encompassed by the terms "bimesogenic compounds with an odd number of atoms in the spacer group between the two mesogenic units."

Applicants respectfully submit that the rejection is not supported by the proper proof on the record and that, in any event, the knowledge of one of ordinary skill in the art coupled with the disclosure in the specification provides more than adequate enablement for one of ordinary skill in the art to make and use the invention commensurate with the claimed scope.

In order to support a rejection under 35 U.S.C. §112, first paragraph, for lack of enablement, the burden lies first with the Patent and Trademark Office (PTO) to provide evidence or objective reasoning substantiating the allegation that the enabling disclosure is not commensurate in scope with the claims. In re Marzocchi et al., 169 USPQ 367 (CCPA 1971). As stated in Marzocchi,

> ".. a specification disclosure which contains a teaching of the manner and process of making and using the invention in terms which correspond in scope to those used in describing and defining the subject matter sought to be patented ***must*** be taken as in compliance with the enabling requirement of the first paragraph of §112 ***unless*** there is reason to doubt the objective truth of the statements contained therein..",

and further,

> "..it is incumbent upon the Patent Office, whenever a rejection on this basis is made, to explain ***why*** it doubts the truth or accuracy of any statement in a supporting disclosure and to back up assertions of its own with acceptable evidence or reasoning which is inconsistent with the contested statement." (emphasis original).

In the instant case, the terms of the claims are identical to those used in defining the invention in the specification. Applicants do not see on the record an explanation of why the PTO doubts the objective truth of applicants' disclosure, i.e., that the invention can be practiced with "bimesogenic compounds with an odd number of atoms in the spacer group between the two mesogenic units." Further, there is no evidence or reasoning provided on the record showing or implying any factual inconsistency with the applicants' disclosure as to the scope of their invention. The only apparent argument made to support the rejection is the breadth of the contested term. But breadth alone – where that breadth matches the breadth in the disclosure – does not support a non-enablement rejection or any other 35 U.S.C. §112 rejection.

Contrary to supporting non-enablement, applicants urge that the evidence supports enablement. Enablement is assessed in the point of view of the person of ordinary skill in the art and the knowledge of such person can provide the enablement. In this case, one of ordinary skill in the liquid crystal art is quite familiar with the terms "mesogenic" compounds and "spacer groups" associated with such compounds. For example, these same terms are used in prior art references, e.g., GB 2,356,629 cited in the Office Action. The ordinarily skilled artisan would immediately envision, within reasonable guidelines, the meaning and metes and bounds of the term "bimesogenic compounds with an odd number of atoms in the spacer group between the two mesogenic units," i.e., a compound which has two mesogenic groups (the meaning of which is clear in the liquid crystal art) which are separated by a spacer group having an odd number of atoms in the chain (the manner of spacer groups useful for liquid crystal compounds also being clear in the art).

Furthermore, the specification provides adequate representative examples (i.e., in the generic formulae and examples) of such bimesogenic compounds and spacer groups to further guide one of ordinary skill in the art in practicing the invention. Based on their common knowledge of the art and the guidance provided by the disclosure, it would be well within the skill of one of ordinary skill in the art to practice the invention commensurate in scope with the current claims.

For the above reasons, it is urged that the rejection under 35 U.S.C. §112, first paragraph, should be withdrawn.

The First Rejection under 35 U.S.C. §103

The rejection of claims 1-15 under 35 U.S.C. §103, as being obvious over GB 2,356,629 in view of Blatch (J.Mat.Chem.) is respectfully traversed.

GB '629 discloses liquid crystal materials and displays containing them which contain bimesogenic compounds.

While GB '629 generically contemplates bimesogenic compounds which are unsymmetrical, all of the examples of specific compounds it gives are symmetrical compounds; see, e.g., Examples 1 and 2. Further, GB '629 provides no disclosure or suggestion of a liquid crystal material which is aligned in a uniformly lying helix structure with a helical pitch of 400 nm or less. It is alleged in the Office Action that Blatch teaches symmetrical and non-symmetrical dimers with an odd and even number of atoms in the spacer group and that, therefore, it would have been obvious to use non-symmetrical dimers with an odd and even number of atoms in the spacer group as the bimesogenic compounds in GB '629. Blatch also teaches that blue phase behavior was found for their non-symmetrical dimers with an odd number of atoms in the spacer group and that this was consistent with smaller pitch for this compound.

Applicants respectfully submit that Blatch merely provides a specific teaching as to the narrow scope of analysis discussed in the article. Blatch is very specific in comparing only the symmetric compounds 2MB.OnO.2MB with the non-symmetric compounds

CBOnO.2MB. Blatch does not provide a general suggestion to one of ordinary skill in the art to use non-symmetric bimesogenic compounds over symmetrical bimesogenic compounds for guaranteeing some property, such as blue phase or smaller pitch. The Blatch teachings do not expand past what is taught for the specific compounds discussed therein. Further, even for these specific compounds, the Blatch teachings are not totally consistent in what properties are to be expected from non-symmetric bimesogenic compounds versus symmetrical bimesogenic compounds. See, e.g., the sentence bridging pages 15-16, and the following first full sentence on page 16, noting a reversal in the trends they found for cyanobiphenyl-cholesteryl dimers. At least for these reasons, it is urged that Blatch would not suggest to one of ordinary skill in the art that, generally, non-symmetric bimesogenic compounds should be used in place of the symmetric bimesogenic compounds disclosed for use in GB '629.

Also, Blatch provides no teaching regarding use of such compounds in a composition together with a chiral component (such as applicants' component B). In fact, the compounds analyzed by Blatch are inherently chiral themselves, thus, there would be no motivation for combining them with another chiral component. Accordingly, there is no suggestion to one of ordinary skill in the art to utilize the non-symmetrical compound taught by Blatch in a composition or display according to GB '629 which is also provided with a chiral component.

Further, Blatch only compares the properties of the compounds, per se. It provides no teaching regarding providing displays with such compounds. This fact adds further to the failure of the prior art to motivate combining the non-symmetric bimesogenic compounds of Blatch into a display or liquid crystal composition of GB '629.

Additionally, neither of GB '629 or Blatch provide any teaching, whatsoever, of providing a cholesteric liquid crystal material which is aligned in a uniformly lying helix structure specifically meeting the property that the helical pitch is 400 nm or less. Compare applicants' claim 1 reciting this element which is not addressed by the prior art or in the Office Action.

Finally, regarding new claims 18 and 19, even if one of ordinary skill in the art were motivated to use the non-symmetric bimesogenic compounds of Blatch in a display or liquid crystal composition of GB '629, there would be no teaching of the specific components for the A and B components of applicants' invention recited in these claims. Thus, these claims, at least should not be subject to the current rejection.

For each of the above reasons, and particularly for the combination of these reasons, it is urged that there is insufficient motivation on the record to combine the teachings of GB '629 and Blatch in the manner suggested in the Office Action. Thus, GB '629 in view of Blatch does not render the claimed invention obvious to one of ordinary skill in the art and the rejection under 35 U.S.C. §103 should be withdrawn.

The Second Rejection under 35 U.S.C. §103

The rejection of claims 1-4 and 7-13 under 35 U.S.C. §103, as being obvious over Coles (J.Mat.Chem) in view of Blatch (J.Mat.Chem.) is respectfully traversed.

Coles discloses a specific analysis of liquid crystal components, potentially for flexographic applications, which analysis includes a symmetrical bimesogenic compound having an even number of atoms in the spacer, i.e., the CBO8OCB compound diagrammed at the top of page 2711.

Coles fails to disclose or suggest a liquid crystal material or a display containing such material which has a bimesogenic compound which is non-symmetrical or a bimesogenic compound which has an odd number of atoms in the spacer group. Thus, it fails to meet either of these elements of component A of the instant claims. Further, Coles fails to teach or suggest a liquid crystal material or a display containing such material which is aligned in a uniformly lying helix structure with a helical pitch of 400 nm or less. To the contrary, Coles appears to disclose a pitch (apparently helical) for its bimesogenic compound at the bottom of Table I, page 2712, which is ≈ 700.

The teachings of Blatch are applied as in the above-discussed rejection and the deficiencies are essentially the same as discussed there, however, they are repeated, as follows, for completeness of the record.

Applicants respectfully submit that Blatch merely provides a specific teaching as to the narrow scope of analysis discussed in the article. Blatch is very specific in comparing only the symmetric compounds 2MB.OnO.2MB with the non-symmetric compounds CBOnO.2MB. Blatch does not provide a general suggestion to one of ordinary skill in the art to use non-symmetric bimesogenic compounds over symmetrical bimesogenic compounds for guaranteeing some property, such as blue phase or smaller pitch. The Blatch teachings do not expand past what is taught for the specific compounds discussed therein. Further, even for these specific compounds, the Blatch teachings are not totally consistent in what properties are to be expected from non-symmetric bimesogenic compounds versus symmetrical bimesogenic compounds. See, e.g., the sentence bridging pages 15-16, and the following first full sentence on page 16, noting a reversal in the trends they found for cyanobiphenyl-cholesteryl dimers. At least for these reasons, it is urged that Blatch would not suggest to one of ordinary skill in the art that, generally, non-symmetric bimesogenic compounds with an uneven number of atoms in the spacer should be used in place of the symmetric bimesogenic compounds with an even number of atoms in the spacer disclosed by Coles. The fact that Coles also only provides a narrow teaching regarding the analysis of the specific compounds disclosed therein further directs one of ordinary skill in the art away from combining the teachings of Coles and Blatch, in the manner suggested in the Office Action. The differences in the compounds analyzed in Coles and Blatch – and the specificity of the respective teachings – are such that one of ordinary skill in the art would not be motivated to combine teachings of Coles and Blatch.

Also, Blatch provides no teaching regarding use of such compounds in a composition together with a chiral component (such as applicants' component B). In fact, the compounds analyzed by Blatch are inherently chiral themselves, thus, there would be no motivation for combining them with another chiral component. Accordingly, there is no suggestion to one of ordinary skill in the art to utilize the non-symmetrical compound taught by Blatch in a composition or display according to Coles which is also provided with a chiral component.

Further, Blatch only compares the properties of the compounds, per se. It provides no teaching regarding providing displays with such compounds. This fact adds further to the failure of the prior art to motivate combining the non-symmetric bimesogenic compounds of Blatch into a display or liquid crystal composition of Coles.

Additionally, neither of Coles or Blatch provide any teaching, whatsoever, of providing a cholesteric liquid crystal material which is aligned in a uniformly lying helix structure specifically meeting the property that the helical pitch is 400 nm or less. The teachings in Coles are, apparently, contrary to this. Compare applicants' claim 1 reciting this element which is not addressed by the prior art or in the Office Action.

Finally, regarding new claims 18 and 19, even if one of ordinary skill in the art were motivated to use the non-symmetric bimesogenic compounds of Blatch in a display or liquid crystal composition of Coles, there would be no teaching of the specific components for the A and B components of applicants' invention recited in these claims. Thus, these claims, at least should not be subject to the current rejection.

For each of the above reasons, and particularly for the combination of these reasons, it is urged that there is insufficient motivation on the record to combine the teachings of Coles and Blatch in the manner suggested in the Office Action. Thus, Coles in view of Blatch does not render the claimed invention obvious to one of ordinary skill in the art and the rejection under 35 U.S.C. §103 should be withdrawn.

It is submitted that the claims are in condition for allowance. However, the Examiner is kindly invited to contact the undersigned to discuss any unresolved matters.

The Commissioner is hereby authorized to charge any fees associated with this response or credit any overpayment to Deposit Account No. 13-3402.

Respectfully submitted,

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